

U.S.C. § 102(b); and claims 6, 15, 17, 18, 20-22, 24-27, 29-31, 33-41, and 44 were rejected under 35 U.S.C. § 103(a) (four different rejections). No new matter has been entered. Claims 45-48 are presented for consideration.

Objection to the Title

Applicants have amended the title to a new title that is clearly indicative of the invention to which the claims are directed. Accordingly, applicants respectfully request reconsideration and withdrawal of the objection to the title.

Drawings

The drawings were objected to because several figures were not labeled. This objection to the drawings has been overcome by Applicants' Request For Approval Of Drawing Corrections. Accordingly, Applicants respectfully request reconsideration and withdrawal of this objection to the drawings.

The drawings were also objected to as failing to comply with 37 C.F.R. §1.84(p)(5) allegedly because they include reference signs not mentioned in the description. Specifically, the Office Action asserted that reference number 58 in Fig. 18 and reference number 14 in Fig. 6 are not mentioned in the specification.

Contrary to this assertion, reference number 58 is mentioned at line 17 on page 20. Similarly, reference number 14 is mentioned at line 10 on page 11. Accordingly, applicants respectfully request reconsideration and withdrawal of this objection to the drawings.

The drawings were objected to as failing to comply with 37 C.F.R. §

1.84(p)(4)(two separate rejections) because reference characters had more than one label in the specification. The specification has been amended so that each reference numeral designates a single label in the specification. Accordingly, applicant respectfully requests reconsideration and withdrawal of these two objections to the drawings under 37 C.F.R. § 1.84(p)(4).

The drawings were objected to under C.F.R. § 1.83(a). The Office Action alleged that the drawings failed to show every feature of the invention specified in the claim 44. The cancellation of claim 44 renders this objection moot.

Claim Rejections

In the Office Action claims 1-44 were rejected under 35 U.S.C. § 112, first paragraph; claims 29-31 and 39 were rejected under 35 U.S.C. § 112, second paragraph; claims 29-31 and 39 were rejected under 35 U.S.C. § 101; claims 1-44 were rejected under 35 U.S.C. § 112, second paragraph (two different rejections); claims 1-14, 16, 19, 23, 28, 32, 42, and 43 were rejected under 35 U.S.C. § 102(b); and claims 6, 15, 17, 18, 20-22, 24-27, 29-31, 33-41, and 44 were rejected under 35 U.S.C. § 103(a) (four different rejections). The cancellation of claims 1-44 renders these rejections moot.

New Claims

Claims 45-48 have been added to claim Applicants' invention. These claims recite subject matter neither taught nor suggested by the prior art. Specifically, none of the cited prior art either alone or in combination teach and/or suggest first and second

control members protruding from respective sides of the body, wherein the control members are mounted for rotation in unison about a common axis passing through the body and the control members. Since the cited prior art fails to teach and/or suggest each and every element of the recited invention, Applicants respectfully request consideration and allowance of claims 44-48.

Conclusion

Applicants' amendments and remarks have overcome the objections and rejections set forth in the Office Action dated February 28, 2002. Specifically, Applicants' amendments to the title have overcome the objection to the title. Applicants' remarks, and amendments to the specification and the drawings overcome the objections to the drawings. Applicants' cancellation of claims 1-44 renders moot the rejections to the claims. Applicants' remarks have distinguished new claims 45-48 from the cited prior art. Accordingly, claims 45-48 are in condition for allowance. Therefore, applicants respectfully request consideration and allowance of claims 45-48.

Applicants submit that the application is now in condition for allowance. If the Examiner believes the application is not in condition for allowance, Applicants respectfully request the Examiner contact the undersigned attorney by telephone if it is believed that such contact will expedite the prosecution of the application.

The Commissioner is authorized to charge payment for any additional fees which may be required with respect to this paper to Deposit Account No. 01-2300, making reference to Attorney Docket Number 108149-00000.

Respectfully submitted,



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MARKED UP COPY OF AMENDED SPECIFICATION

Beginning at line 24 on page 11

Tank 10 typically comprises a downwardly extending tube (not shown) which slidably surrounds a support column 16 secured underwater, usually to the sea [of] or river bed 18, in an upright position. Typically, a large diameter [plane] bearing 20, for example a plane bearing, is secured in the top of the tube and a similar bearing (not shown) is secured in the bottom of the tube so that the two bearings are widely spaced apart. Thus, said bearings are slidable axially and rotateably relative to the column 16. Further bearing strips [20] may be provided as an alternative or in addition to the circular bearings as shown in figure 11.

Beginning at line 26 on page 12:

The maximum angle of inclination of the hydroplanes 22 is also adjustable. Whilst hydroplanes 22 typically act as hydroplanes causing lift by the action of water flowing over their upper and lower surfaces, control members, for example hydroplanes 22, can be caused to act as water deflectors much in the same way that a kite deflects air. This is shown in figure 12 and will be described in further detail later.

Beginning at line 17 on page 13:

In operation, the shape and in particular the convex sides 14 of tank 10 automatically orientate it like a weather vane so that control members, for example hydroplanes 22, are kept substantially at right angles to the water current indicated by arrow 26. This orientation reduces drag on the tank and increases the velocity of the current passing along particularly the widest most portion of the sides and therefore over hydroplanes 22.

Beginning at line 25 of page 13:

The action of water current indicated by arrow 26 on hydroplanes 22 causes the tank to move upwards and downwards on column 16 depending upon the inclination, for the time being, of the hydroplanes. Thus, the tank is caused to oscillate as indicated by arrow 32 so as to alternately compress (as it moves downwards) and decompress (as it moves upwards) the air contained inside it between top 12 and water surface 28.

Beginning at line 17 on page 15:

The cycle is repeated beginning again with hydroplanes 22 being inclined in the other direction with respect to the current indicated by arrow 26.

Beginning at line 12 on page 16:

Since the tank 10 floats and is slidable relative to column 16 it is self-adjusting to changes in the height of water surface 28. Furthermore, since it can rotate on [monopile] column 16, which may be a monopile, it is self-adjusting to changes in the direction of water flow. This can be particularly important for tidal flows where inward and outward tidal flows are not at approximately 180 degrees to each other. This is shown in detail in figure 13 in which cables 33 can be used to moor tank 10 on monopiles 25 when inward and outward flow are in substantially opposite directions or in river flows. A limited amount of rotation can be possible when using mooring cables if the attachment points of the cables are designed for this. However, a central [monopile] column 16 or monopile is typically used to mount tank 10 when inward and outward flows are at angle β with respect to one another. This allows rotation of tank 10 by angle β to align itself with the prevailing tidal flow.

Beginning at line 29 on page 16:

The angle of inclination of the hydroplanes relative to the direction and speed of the water current governs the magnitude of lift and drag forces on the tank. Thus, typically control members, for example hydroplanes 22, function as hydroplanes [acting as hydroplanes] generating lift but little drag. In figure 12, water flow indicated by arrow 26 is redirected downwards by control member [22d] 22D causing tank 10 to move in the direction of arrow 32. This is similar to the way that a kite maintains its height. Control member 22D is rotated through a vertical plane about a horizontal axis to cause the tank 10 to reverse its direction of motion. Control members 22D can however cause drag so their use may be limited to particular circumstances where drag is not a problem, such as when firm cable moorings are available.

Beginning at line 1 on page 18:

Hydroplanes or control members 22a are located on the widest portion of tank 10. Alternative or further hydroplanes or control members 22B and 22C can be located at other points though this is less preferred. Hydroplanes or control members 22B are equally spaced whereas hydroplanes or control members 22c are not equally spaced. By locating hydroplanes in a vertical direction, one above the other, roughly perpendicular to the water flow the turbulence flow produced downstream does not interfere with its neighbours. Thus, typically one of the [series] hydroplanes or control members 22A and 22B and 22C, is selected rather than having hydroplanes spaced along the tank in the direction of flow of the water. The hydroplanes may be staggered, i.e. spaced vertically but overlapping in a horizontal direction such as hydroplanes 22E in figure 8.

Beginning at line 23 on page 18:

Figure 10 shows fixed hydroplanes 22 which do not rotate with respect to [member] tank 10. Rotatable tail hydroplanes 34 cause the tank to rise or fall. Once this rise has begun, it slightly tilts the tank so that hydroplanes 22 are now at an angle with respect to water flow 26 thus adding to the forces causing the tank to rise or fall. Other hydroplanes, or mounting structures, fixed with respect to the tank on which reversible hydroplanes are mounted may be used. These resemble pivotal flaps on aeroplane wings. A further type of hydroplane suitable for use with the invention is shown in Fig. 9B. Here, hydroplane 22F shown in cross section is flexible and can be flexed so that its curvature is inverted (reversed) causing lift 32A or downward thrust 32D as appropriate.

Beginning at line 7 on page 19:

Figures 14 to 18 show the use of a prime mover 40 mounted about a [monopile] column 16 monopile, or moored via cables 33 and provided with hydroplanes 22 causing prime mover 40 to rise or fall on the reverse of these hydroplanes. Several different kinds of power conversion means are provided for converting the oscillating motion of prime mover 40 into usable forms of power, whether this is water stored at a higher level, mechanical rotation, electrical power, hydraulic power and so on. Whilst tank 10 is typically buoyant, prime mover 40 is typically partially buoyant so that it is submerged when at rest. Prime mover 40 rises and falls in exactly the same way as tank 10 by reversing the inclination of hydroplanes 22 or control members 22D as previously described. Thus, prime mover 40 oscillates up and down in the direction of arrow 32.

Beginning at line 22 on page 19:

In figure 14, a hydraulic piston pumps fluid within a control chamber [40] 44 to generate power or connects to a crank.

Beginning at line 25 on page 19:

In figure 15 a similar hydraulic pump 42 is used though in this case control chamber 44 is located beneath the surface and is moored to the sea bed by cables 33. Thus, the prime mover 40 here floats above the sea bed. Typically column 16A, about which prime mover 40 is located, comprises slots through which members mounted on prime mover 40 project to drive pump 42 so causing the piston in hydraulic apparatus 42 to rise and fall. Also column 16A is open to the surface to permit access to the control [and generating] chamber 44 and so that power can be extracted for example by cables.

Beginning at line 18 on page 20:

In figure 19, an alternative embodiment uses rotating cylinders to generate upward and downward thrust. Cylinders 61 rotate in the direction of arrow [62] 63 with respect to current indicated by arrow 26. The cylinders produce drag 62 but also a downward force 60, or an upward force when rotation is reversed. Whilst rotation may be produced by driving connecting rod 64 using electricity, current indicated by arrow 26 may be used to provide the necessary rotation via rotating wheel 70 which via connecting means 68 and gear box 66 causes rod 64 to rotate. A windmill type wheel rotating about a horizontal axis (not shown) could also be used. The gear box could be used to produce the reversal in rotation 63 without changing the direction of motion of rotating wheel 70.